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Original Communications.

VENTILATION OF OCEAN STEAMERS.

Read before the British Association for the Advancement of Science.

By A. LAPHORN SMITH, B.A., M.D., M.R.C.S. Eng.

Any one comparing the steamship of twenty-five years ago with that of to-day cannot fail to be impressed with the vast improvements which have earned for the latter the title of "floating palaces."

In some respects, however, there is still room for improvement, and in none more so than in the matter of ventilation.

That the ventilation of ocean steamships is, at the present day, far from perfect, is a fact which will be generally admitted by nearly every one who has crossed the ocean. Were any proof necessary I have the evidence of more than a hundred reliable witnesses, including several captains of steamers, whom I have questioned, as well as my own experience, to testify that this important department of the sanitary arrangements has not kept pace with the other profuse and elaborate provisions for the passengers' health and comfort.

Many have expressed the opinion that the feeling of discomfort and malaise is more often due to ship sickness than to sea-sickness; while I would venture to go a step further and call it by what I think should be its real name,—partial asphyxia or suffocation.

Many have told me that as long as they remained on deck they were perfectly free from

any discomfort, no matter how much the vessel might be rolling; while others, who having succumbed to the first night's deprivation of air, were too weak to get on deck again during the remainder of the voyage, have assured me that weeks, and in some cases months, elapsed, before they had completely recovered from the effects of it.

My own experience was this: I crossed the Atlantic six years ago in the best steamer of one of the best lines, and having my choice of rooms I chose one amidships, on the main deck. It measured about six and a half by seven, by eight feet, and as I had the room all to myself it allowed me 364 cubic feet of space, less the amount occupied by my own body, two beds, a sofa and other furniture, and my valise; leaving about 300 cubic feet of air for myself.

I was obliged to keep my door locked and the regulations forbade the opening of the port hole. I did not notice however until next morning that the obliging steward had, at the request of the previous chilly occupant of the room, pasted paper over the tiny perforations at the top of the partitions, which were supposed by a flight of fancy to fulfil the purposes of ventilation.

But next morning my aching head and furred tongue made me realize that I was breathing an insufficiently oxygenated atmosphere, rendered poisonous moreover, with carbonic acid gas.

For all authorities on sanitary science are agreed that the smallest quantity of fresh air consistent with health is 3000 cubic feet per hour for each adult human being; which would suppose that the air in my above mentioned 300

cubic feet of space was completely changed ten times in every hour. On the contrary it was not changed once during the nine hours I remained in my room.

Even if the perforations in the top of the partition had not been closed up, I could not have obtained the minimum amount of ventilation necessary for health, for we have no reason to suppose that such a heavy gas as cold carbonic acid could perform such a miraculous feat as to climb to the top of the partition and crawl through those little holes.

On the contrary, under the most favorable circumstances with natural ventilation, it is admitted that the air in a room cannot be changed oftener than three times in an hour. How utterly impossible, therefore, with similar means, to change ten times in an hour the atmosphere of a room so especially unfavorably situated for ventilation as a stateroom *below* or even *between* the decks of a ship.

What would have been the result if there had been, as the room was intended to contain, three occupants instead of one? I dread to think of it. Perhaps our fate would have been that of the seventy persons who were found dead next morning out of the one hundred and fifty passengers who were shut up in the cabin of the Irish steamer "Loudonderry," during a stormy night in 1848. What must be the feeling of the emigrant, who according to the regulations of the British Board of Trade is allowed seventy-two cubic feet of space? Is the air in the "steerage" changed forty-three times in an hour, which it should be in order that each occupant of the above seventy-two cubic feet of space should receive the necessary three thousand cubic feet of fresh air? Manifestly not, since by natural means the air in a room can only be changed three times in an hour. If there are twelve hundred passengers below deck, as there frequently are, all night, they would require at last three million six hundred thousand cubic feet of air per hour, while ten funnels or ventilators one foot square, into which the wind is blowing at the rates of thirty miles an hour, would only deliver one million five hundred and eighty-four thousand feet, or nearly two million feet per hour, short of the requirements of health.

Professor de Chaumont says: "Air is the prime necessity of life. Food or water may be abstained from for a considerable length of time,

and we may thus have an opportunity of replacing either should we doubt its purity or healthfulness, but the atmosphere around us we must breathe or die. Hence the paramount necessity of having it pure. But, he continues, though this is apparently so obvious, attention to its importance has been very generally omitted. I may add, that while defective ventilation has caused thousands of deaths on shore, the above remarks are especially true when applied to ships. For it is a well known and generally admitted fact that ship fever was due to the emigrants being compelled to breathe over and over again an atmosphere charged with organic matter in a state of decomposition; while only the thin walls of the vessel stood between them and an unlimited supply of the purest of pure air."

Although the Merchant Shipping Act of 1855, by forbidding the carrying of passengers in the hold, and by limiting the number to be carried on deck to one for every seventy-two cubic feet of space, put an end to such wholesale slaughter, still I think it is evident from what I have said, that with the present system of ventilation, that amount of space is only barely enough to sustain life, without even mentioning comfort or health.

But whether the ocean traveller gets even this small amount of space or not, is left very much to the discretion of the emigration officer at the port of embarkation, who may or may not understand the importance of a sufficient supply of air.

Should anyone doubt the exactness of the scientific experiments and calculations of the most eminent authorities, such as Richardson Parkes, de Chaumont, Hammond and others, on whose authority I have made the above statements, let him go down into the steerage or even staterooms of an ocean steamer, just arriving from sea, and his nostrils will testify to the truth of these assertions.

Dr. Heber Smith, in the United States Marine Hospital report for 1871, says: The sickness rate among seamen is probably greatly augmented by the want of light and air, and by the presence of dampness and filth so often observed in the forecables of even the largest and best equipped sailing and steam vessels. Many of the forecables which he examined illustrated the bottle form of ventilation, for where the hatches were closed, as they generally are in rough weather, the bottle was complete, even to the cork.

To these causes he attributes the constant deterioration going on in the ranks of the United States merchant marine and the lamentable short average of the mariner's life, which is only twelve years, seventeen thousand becoming unfit for service or dying every year.

"Is it any wonder," he says, "that there is a scarcity of efficient sailors? that vessels leave port short-handed every day? that shipwrecks and loss of life grow more frequent year by year?"

It is true the latest additions to the fleet of ocean steamers are provided with a considerable number of funnels or air shafts; but under the most favorable circumstances, that is when the wind is blowing against them, the air only gets into the passages into which the air shafts open, but not into the rooms; while on the contrary when the wind and the steamer are both going in the same direction and at about the same rate of speed, no air is forced down the ventilators at all.

Now, lest the owners and architects of ocean steamers might think that I was asking too much for the cabin and steerage passengers and seamen, whose supply of air is respectively bad, worse and worst, let me refer them to Wilson's standard text book on Hygiene, p. 90, where the author says that the Barrack Commissioners of England recommended a minimum allowance of six hundred cubic feet of space per man, but that experiments made by Dr. & Chaumont, Professor of Hygiene at Netley proved most incontestably that even this comparatively large allowance is inadequate for the purposes of ventilation. The author admits, however, that even so small a limit as one hundred cubic feet per man can be kept sufficiently pure, provided the most approved methods of artificial ventilation be carried out.

Having thus briefly shown the defects in the present method of ventilating ocean steamers, let me suggest a remedy.

Happily the latter is as simple and effective as it is important. For although any increase of cubic space for passengers and sailors would greatly increase the cost of carriage, the *number of times* in an hour that the air in that space could be changed, might be very considerably increased at a positively trivial cost.

Dr. W. G. Metcalf, Medical Superintendent of the Ontario Lunatic Asylum, Kingston, writes t

me that the inmates of the main building to the number of three hundred and ninety are actually supplied, by means of a steam fan, with three thousand eight hundred and forty cubic feet of fresh air, each, per hour. And many other prisons and insane asylums on this continent are ventilated in the same way.

Now, I would ask, why could not a similar method be adopted on board ocean steamships? Their shape, resembling a box, completely closed on five sides, with only a few small openings in the sixth, precludes them from any possibility of being effectively ventilated by ordinary means. Why not, therefore, provide a fan blower worked by steam, and which could, no matter which way the wind blew, be relied upon to introduce into every part of the ship occupied by human beings, at least that amount of fresh air which accurate experiments, made by the most reliable scientists, have shown to be absolutely necessary for health.

I cannot believe that the question of cost would be any objection; for the same passengers, or the cabin ones, at least, who are so insufficiently supplied with air are most lavishly provided with every luxury; thousands of dollars being expended on decorations alone; and a surfeit of food being given every few hours during the day.

With the present system of ventilation on ocean steamships under the most favorable circumstances, the steerage passengers are not allowed more than two hundred and sixteen cubic feet of air per hour; while the inmates of the lunatic asylums and penitentiaries never receive less than three thousand eight hundred cubic feet of fresh air per hour, and no civilized country would permit them to be deprived of air to the same extent as the emigrants are.

The only objection that could be raised against the fan ventilator would be the draught; but that could be avoided by having inlet pipes perforated with a large number of small holes, and the speed and pressure so regulated that only the proper amount of air would be distributed and no more.

Such a fan, I am informed by a practical engineer, would cost the small sum of six to eight hundred dollars. It could be driven by all of the numerous small auxiliary engines which have to be kept in readiness for an emergency, such as pumping; while the necessary steam would not cost as much as one cent a day per

passenger ; and if the distributing pipes were put into every part of the ship while it was being built, the cost would not be appreciable.

Moreover, such a fan blower would almost save its cost in a single voyage, for it could be utilized while the ship was loading grain, in doing all the trimming, which, on account of the dust, is a very unhealthy, and, consequently expensive operation. By means of a hose pipe attached to the fan blower the grain could be driven with great force away from the delivery pipe of the elevator, without a single man going into the hold.

Owing to the large development of the cattle trade during the last few years, the necessity for better ventilation is more than ever felt. Although the steamship companies do all in their power to have the steerage compartments thoroughly cleansed, still with the present system of ventilation it is impossible to completely get rid of the smell. Many emigrants have told me that the smell of cattle carried on the previous trip, added to that of the closely packed and half suffocated passengers, was simply horrible.

In view of the immense emigration now being directed towards our shores, and the responsibility which devolves upon us of seeing that the emigrants are provided for after their arrival ; and considering how important it is that they should arrive here in a healthy instead of in a sickly condition, and in view of the light which science has shed upon the requirements of human life, it becomes a question whether the time has not already arrived for our Government to make such representations to the Imperial Board of Trade as will lead to a change being made in the Merchant Shipping Act, whereby a definite minimum amount of fresh air would be provided for every statute adult on board, instead of that important point being left as now to the discretion of the emigration officer at the port of embarkation.

The quantity of fresh air to be furnished to the occupants of the cabin and staterooms may safely be left to the force of public opinion, but I venture to predict that the company which would make a decided advance in this regard, would make a rich return for the small amount of money so invested. The travelling public would not be slow to appreciate the effort to supply them with a sufficient supply of the first necessary of life.

As a natural sequence to the first portion of my paper, I wish to call your attention very briefly to the question of warming and cooling the air which might be so plentifully provided by the above mentioned method.

There is no doubt that during several months in the year a great deal of real hardship and suffering is experienced by the emigrants and seamen who cross the Atlantic, owing to the absence of any regular system of heating.

During the time I was connected professionally with the Marine and Emigrant Hospital, Quebec, and other institutions, I have had hundreds of opportunities for observing the amount of sickness, suffering and death, especially among young children, directly traceable to the cold experienced on board ship during a Winter voyage.

Indeed any system of ventilation would be incomplete, unless combined with means of heating the air provided by it.

For the average emigrant or sailor would prefer to breathe the foulest of foul air, partially warmed, rather than the purest of pure air freezing cold. Indeed, scarcely a Spring passes without adding one or more to the list of sailors who have paid the penalty of their life for the warmth obtained from a charcoal pan. Nor would all this sickness and death be either difficult or costly to obviate if the method of ventilation which I have suggested were carried out.

"In the Insane Asylum at Kingston," Dr. Metcalf writes me, "the air passes in Winter over steam coils and becomes hot, the amount of heating to which it is subjected being regulated by adjustable valves." On steamers a zinc chamber or heater might be constructed around the boilers, through which the air could pass before being forced through the fan. Only in very cold weather would it be necessary to heat up the steam coils.

The openings for the admission of warm, fresh air should be near the ceiling, and the foul air openings near the floor, and these latter should be led into the smoke-stack or furnaces.

While the temperature on the Atlantic is generally too low, there are other voyages where the passenger is put to considerable discomfort from excessive heat. An eastern traveller in a recent paper states that average midnight temperature in the saloon and staterooms was one hundred and ten degrees F., most of the passengers preferring to pass the night on deck.

And yet how easy to remedy this state of things. By working the fan up to a high rate of speed so as to compress the air, and then letting it suddenly expand, it could be chilled to any degree desired; and the passengers, instead of being nearly roasted alive on deck, might remain below during the whole voyage, revelling in the delightful coolness of the temperate zone, while the air above and the water around them was simmering at one hundred and twenty degrees. To show that such a plan is quite practicable is made evident from the statement of the writer that he gathered a snow ball from the walls of the refrigerator, which was kept cold in that way.

It would, I think, be preferable to do with one dish or even one meal less each day for the luxury of a cool and well aired room to sleep in at night.

I have placed this matter very briefly before you, but I trust that the weight of the influence of such a learned body as the British Association for the Advancement of Science, which we are all so glad to welcome to this country, may lead to the further investigation of this important matter, so that the owners and architects of ocean steamships may recognize the evil, and devise some remedy that will lead to some improvement in the ventilation of ocean steamships.

SULPHONAL.

By H. L. REDDY, M.D., C.M., L.R.C.S.E., L.R.C.P.L.,
Professor Midwifery, Bishops' College.

Or as it is known chemically diethylsulphondimethylmethan. It occurs in the form of large, flat, colorless crystals which are tasteless and devoid of smell. Sulphonal is soluble in 18 to 20 parts of boiling water and 1 to 100 in tepid water. It dissolves more rapidly in alcohol or alcohol mixed with ether. Acids and alkalis do not affect the composition of the body.

Within the last few years a number of new remedies have been introduced, the action of which we have been told was unlike opium, chloral, cannabis, or the bromides. Most of these drugs belong to the acetal group of compounds, they include methylæ, acetophenon (known as hypnon), urethan, parædehyd, and hydrate of anylen. Although some of these have found favor with a few of the profession none of them are really satisfactory.

Sulphonal was first prepared by Bauman, who

discovered it whilst investigating a series of bodies known as disulphones, to which it belongs. Its action (according to German authority) appears to consist merely in the intensification of those factors that lead to natural sleep in the physiological sense, or in supplying the periodical desire for sleep in those cases where it is wanting.

Sulphonal on the same authority is said to have none of the disadvantages inherent in deadly narcotics, and is more reliable than the Bromides. It does not disturb digestion, is not constipating, no unpleasant after-effects, is not likely to cause a "habit" even when employed for a long time. Schwalbe, in the *Deutsche Med. Woch.*, concludes that:—

1. Sulphonal is an agreeable medicament, being odorless and tasteless.

2. It acts as a hypnotic in cases of "nervous" sleeplessness, in doses of fifteen to thirty grains. When the insomnia is the direct result of organic disturbances due to existing disease the action is more or less uncertain.

3. Sulphonal does not affect temperature, pulse or respiration, and is to be preferred to morphine and chloral when heart failure is to be feared. It is especially to be commended for children.

4. The subjective manifestations, immediate and subsequent, are insignificant, and not a contraindication for the use of the drug.

Dr. Rabbas has used it at the Marsburg lunatic asylum, over 200 times and speaks very highly of it.

The best time to administer it would appear to be the late afternoon or early evening hours, when it is followed by 8 to 10 hours of natural sleep. The dose is from 15 to 60 grains. The hypnotic effect is observed in from ½ hour to 2 hours after its exhibition.

Women are more easily affected by it than men. It is found useful in febrile wakefulness, in the restlessness of organic heart disease and even in the delirium of dementia.

Mr. T. E. Lovegrove in the *British Medical Journal* says that his experience has been very discouraging. For several hours after the exhibition of the drug, there was no appreciable effect, but during the greater part of the following day there was extreme drowsiness and considerable cyanosis. Mr. Lovegrove finds the best vehicle for its administration is pulv. tragacanth co. and water.

ON THE REMOVAL OF OPACITIES OF THE CORNEA BY MEANS OF GALVANISM.

To the Editor of The MEDICAL RECORD.

SIR: The purpose of this note is to call, or rather recall, the attention of the profession to the therapeutic value of the Galvanic current in the treatment of opacities of the cornea. Some cases I have now under observation appear to show that this application of electricity has been allowed to fall into undeserved desuetude. I cannot offer yet complete results of treatment to support this claim, but the following statement may serve to show that it is worthy of some attention. In February last I began to use the galvanic current for the removal of an opacity of the cornea, without knowledge that it had been so used before. The case was one of recent macula of both cornæ, visible at a distance of several feet. It has now wholly disappeared from one eye, and is barely discernible in the other, from which I expect continued use of the remedy to remove all trace of blemish and defect of vision. Another case, taken up a few days later, a kidney-shaped macula about two and a half lines in length, is now represented by a thin speck-like spot which the patient and her friends no longer see. This, too, is steadily melting away. Of the seven other cases under treatment, it will suffice here to say that they varied in size from that of a millet-seed to the whole circumference of the cornea, from a nebula to a dense white leucoma, and in duration from forty days to forty-eight years.

All of these cases are steadily improving, two of the most extensive maculæ being merely fragmentary remains of the original, while the cornæ elsewhere are quite clear. The rate of disappearance seems to depend chiefly upon the size of the opacity, which, like a heap of snow, melts away from the periphery towards the centre, the oldest but little more slowly than the most recent.

The method I have employed is as follows: One pole of the battery in the palm of the hand, the other upon the closed eyelids, ordinary sponge-covered electrodes being used. If the eye is or becomes in the least congested on the seat of pain, the anode should be placed there; otherwise the cathode should be used as the therapeutic pole, its action being more rapid, apparently. The strength of the current should not exceed three milliampères, and with sensitive eyes a strength of two milliampères is better. The sitting should

not extend beyond three minutes, unless the eye shows, after trial, unusual tolerance of the current; a five minutes' sitting sometimes irritates the organ. An application was made daily at first, but this was found to be too frequent—productive of irritation. Sittings are now held every other day without discomfort in any case.

A galvanometer and a smoothly-working galvanic battery are indispensable in this treatment. I am using Barrett's milliampère-meter and chloride-of-silver battery.

Very respectfully,

C. H. H. HALL,

Passed Assistant Surgeon.

U. S. NAVAL HOSPITAL, YOKOHAMA, JAPAN,

Society Proceedings.

NEW YORK ACADEMY OF MEDICINE— PEDIATRIC SECTION.

Meeting, June 27, 1888.

DIETETIC MANAGEMENT OF THE SUMMER DIARRHŒA (OF INFANTS.

With much pleasure he had accepted the invitation of the Chairman to give his views on this question, which was one to which he had given much attention, having had a large experience in the treatment of the disease in Philadelphia hospitals and private practice. When called to treat a case of this nature, his first question was: what food has the infant been taking? As yet he was quite unable to believe that even in acute cases it was necessary to take away the milk of the mother or nurse. They continue to suckle the child, but the administration of water is very useful, as the child is often thirsty. Stimulation is of the utmost importance. Brandy or whisky, a teaspoonful three or four times a day, or thirty drops in sweetened water every two hours. As to other food besides mother's milk, if the milk of the mother is faulty, the nursing must stop and the infant be fed artificially. On the other hand, if the mother's milk is apt to be good, it might be supplemented with one-half ounce of beef juice or wine whey. As to the dietetic treatment of the summer diarrhœa in hand-fed children, the first thing is that the food be carefully investigated. The best food for hand-fed infants is cows' milk; if it disagrees, put the infant on the exclusive use of beef juice.

Cows' milk contains about three times as much casein as human milk. When cows' milk is diluted, the amount of fatty material is reduced, and therefore cream and sugar should be added. To undiluted cows' milk, too, sugar must be added.

Lastly, cows' milk is acid, human milk is alkaline. Hence, bicarbonate of sodium or lime water should be added, the latter being the best.

In the dietetic treatment of cholera infantum he depends upon milk foods mainly; diluted cows' milk with the addition of lime water has given the best results. Not more than two to four ounces should be given at each feeding, and we should take a lesson from nature in this respect. The amount of food should not be increased until the child is about a year old. It is also desirable to vary the food. It may be diluted, and cream and milk sugar added; if cane sugar be used instead, the quantity should be less. The addition of some starchy material, such as dextrin, is useful. One of the best is arrowroot; and barley water, as recommended by Dr. Jacobi, is very good. Mellin's Food has often proved most useful. In some cases excellent results are obtained from taking away all milk and administering beef juice alone, but many infants will vomit the soup as soon as given.

It is also necessary that precise directions be given how the infant should be fed, as to amount, frequency, etc. A young infant should be fed every two or three hours; older infants four to six times a day. Experience had brought the author to the conclusion that only in rare and exceptional cases is it either desirable or necessary to feed more frequently than every two hours. If collapse seems imminent, stimulants are very good. In dealing with summer diarrhoea, the treatment should not be changed before well ascertaining the result of the first measures. Often, if the physician had waited a few hours longer, he would have found that he held the key to the situation. Ripe experience of the physician will be better than great learning.

As to micro-organisms and the chemical poisons in the milk, it is a fact that milk and food prepared with it may become dangerous. The existence of the chemical poison in milk has been demonstrated, so has the micro-organism. But the time is not yet ripe for the acceptance of the theory. The arguments are strong against it. Infants are attacked though nursed directly by the mother, in whose milk no micro-organism can exist. If we make no advance in our treatment, put the infant on an animal diet. The use of an exclusively animal diet is not new, but old. Certain cases will yield to it, in exceptional instances it fails; then we must return to milk. If micro-organisms were the only cause, no child would ever recover, and yet they continue to thrive under the milk treatment. If he were to accept the micro-organism argument, he should have to abstain from giving animal food; but then the difficulties are enormously increased; this no one will deny who has tried to feed on an exclusive meat diet. If vomited, we must try a mixed diet of milk and meat. The decision of the question: what constitutes cholera infantum? will often be very difficult.

If infants are taken from the breast, often they will not take it again. Continuing the assumption that micro-organisms are the sole cause of the disease, an animal diet must be substituted. It seems strange that as soon as an infant becomes ill, we must take from it that food which is best for it.

Dr. S. BARUCH read a paper entitled

A CLINICAL STUDY OF THE ETIOLOGY AND TREATMENT OF SUMMER DIARRHOEA OF INFANTS.

He said the season for cholera infantum was again upon us. There was a time when he dreaded the approach of summer. He had been taught to regard the disease as an inflammation, chiefly gastro-colitis, and to give minute doses of mercury. The inefficiency of this treatment showed that something must be erroneous. As long as he continued to look upon the disease as merely inflammatory, his severe cases died. He believed it to be chiefly due to the ingestion of micro-organisms. The theories hitherto prevalent were faulty, and have led to false methods of treatment.

The causes were: first, insanitary conditions, poverty, overcrowding; second, atmospheric conditions; third, bad feeding. The first causes prevail not only in cities, but under different conditions. He had observed the disease in rural towns, etc., in the backwoods of South Carolina, in Washington Heights and Audubon Park, and had found cases just as severe among the negroes of the South. While filth increases the mortality, the cause is due to micro-organisms.

Artificial feeding has long been accepted by the profession as a cause. Out of five hundred cases of summer diarrhoea, only a few occurred among breast-fed children. That had been ascribed to the difference between cows' milk and woman's milk, but this is an error. The chemical composition of cows' milk had been investigated again and again, and the difference shown. But if the artificial food was changed by addition, dilution, etc., we still find great difference in the toleration of the infant's stomach in summer and winter respectively. The rescarches of Esserich have shown that the great cry about cows' milk has no foundation. He had given casein in excess, and found it well digested. Healthy infants are capable of assimilating casein far in excess of their requirements. The author would not go as far as Esserich, for practically cows' milk is not so well adapted to infants as has been accepted. Yet the cause must be sought in another direction than in the difference of composition.

That high temperature exercises a powerful influence is true; in what manner does temperature change the prognosis? Its depressing effects are pre-disposing elements, but if this were the correct interpretation, it would not affect the clinical observation that the three factors act in unison, but their *modus operandi* has not been correctly understood. Why does cows' milk not cause disturbance in winter? The development of bacteria

is the cause in summer. It was first shown by Pasteur that the coagulation is due to the bacteria. The most important discovery was made by Lister, that a drop of sour milk added to urine produced a change, and that a drop of this urine again caused the souring of the milk. Owing to the presence of bacteria the proper breaking up of the casein is interfered with, the intestinal tract becomes inflamed and thus gives rise to summer diarrhoea. The author cited different writers in favor of this view.

This points the way to treatment: bismuth, mercury, etc., have given good results, while opium has failed.

We know the human milk is aseptic in the gland and is the best prophylactic. The best substitute is cows' milk, which is also free from bacteria as it comes from the udder. Milking is liable to introduce impurities, and foam, which is air with germs, is especially liable to catch any floating impurities. We had learned in other departments how important it was to prevent its access to the uterus. A milking tube would be useful, but it is not generally applicable, and the same might be said of goats recommended as nurses.

Next to preventing the access of noxious germs, sterilization of cows' milk must be good. Soxhlet's apparatus comes near to the requirements, and Caille and others have simplified it. These gentlemen think, because milk does not sour, therefore it is sterilized. But it has been shown that this is not necessarily true. Continuous exposure for half an hour at 100° C. is not sufficient for sterilization. Hence Caille's experiments were not quite as successful as Soxhlet's. Boiling the milk has been recommended by Jacobi as long ago as 1870. By this the casein is made more soluble and digestible. Various authorities corroborate this fact. He had convinced himself that milk could be certainly sterilized if the temperature can be raised to 266° F., under pressure, and a lower temperature will suffice if continued for a longer time.

The hygienic management of the infant is next in importance. This remark applies to all diseases due to micro-organisms. A daily bath is to be recommended, and a proper amount of undisturbed sleep is absolutely necessary; hence, fondling should be avoided. Teething no longer requires the use of the gum lancet, which could be laid on the shelf along with other useless instruments. Though the nervous system is irritated, the process is a natural one. In the way of prophylaxis, attention to the infant's mouth is important. In the mouth, germ-free human milk undergoes no change. It is advisable in the summer months to clean the infant's mouth with a weak solution of boracic acid. Sudden changes of temperature in August are best guarded against by a flannel bandage and sacque.

In the curative treatment, diminish or remove the bacterial supply. A wet-nurse should be em-

ployed where possible. The artificial food must be looked after. Barley water and meat broth are very excellent substitutes for milk. A solution of white of egg in water is also a valuable nutriment. The presence of the bacteria must be neutralized, and all fermenting material removed from the stomach. The stomach requires absolute rest. All food and drink must be withheld for five or six hours. After the stomach has been thoroughly cleansed—if rest does not bring relief—peppermint, etc., may be tried. A dose of calomel will generally be retained, and acts not as a parasiticide merely, but removes the bacteria from the canal. Castor oil will sweep them out, and large draughts of warm water will do it. A rubber catheter will answer if attached to the fountain syringe. The tube is anointed with vaseline, and introduced and retained until a quart of water has passed, the child being laid on the stomach. The thorough irrigation of the large intestines, by the physician or competent nurse produces a most soothing effect on the patient; almost invariably quiet slumber ensues, even during the flow of the water. He cited J. Lewis Smith and L. Emmett Holt in corroboration of this fact. Local troubles should be met by local measures. Though he had used antiseptics, he did not think them advisable because they cannot be made strong enough; still the internal administration of antiseptics, naphthalin, etc., has found advocates. Bichloride of mercury and bismuth might be useful. He had abstained from medicinal treatment so as to maintain the integrity of the stomach.

Prostration of the vital powers is often pronounced. Elevated temperature marks generally a necessity for its reduction. He had not resorted to medicinal antipyretics. Cold baths will often change the aspect of the case. He cited a case in illustration of this point. Inanition, caused by diarrhoea, must be met by careful diet. Cows' milk, properly sterilized, will be useful, and the addition of dextrin and predigestion will be good. Warn mothers not to add milk to prepared food containing milk. He did not believe in Mellin's Food because it requires the addition of milk. Stimulants are good; whiskey and brandy are the best.

Opium was the only drug which will stop peristalsis of the bowels.

Dr. G. B. FOWLER spoke on the

RELATIVE DIGESTIVE POWER OF THE PEPSINS IN COMMON USE, AND THE ACTION OF THE DRUGS EMPLOYED IN THE TREATMENT OF SUMMER DIARRHOEA UPON DIGESTION.

He gave a synopsis of the results of some experiments he had made with different pepsins to ascertain their digestive value. After briefly dwelling upon the mode of manufacture of the article, he stated that in view of the fact that each maker claimed that his product was the best, he

had procured thirteen different kinds from different houses. He had put one grain of each into a bottle and had added to each bottle eight ounces of acidulated water (hydrochloric acid and water of one-half per cent. strength). Twelve hundred grains of white of egg, coagulated by boiling and passed through a sieve and very finely comminuted, were added to each bottle. For comparison the first bottle had received only a charge of acidulated water and albumen without any pepsin. The bottles were exhibited. The results were very different from what might have been expected. Most of the pepsin seemed entirely inactive. He was very much surprised with the result obtained with the article made by Parke, Davis & Co., one grain of which had completely digested twelve hundred grains of albumen. Fairchild's was second best, but had not done quite as well. The rest manifested little or no power. It is claimed that this is not a fair test; that a more bulky precipitate may weigh less than one that is less bulky. But the speaker saw no difference in the physical characters of the respective residues, and it was very evident that in these experiments the more bulky invariably were the heaviest. He had used water enough for all the albumen to go into solution. Having ascertained the time required for digesting the entire amount of albumen, he had added some of the medicines we were in the habit of giving in summer diarrhoea, to see whether retarding effects were present or not.

Salicylate of sodium stops it absolutely. Somebody says it does, so by fixing the hydrochloric acid: The quantity used was 20 gr.; even so small a quantity as 3 gr. retarded the process about two hours. Salicylate of sodium is very sparingly soluble in hydrochloric acid.

Quinine, 20 gr., there was no digestion; 3 gr. had no effect.

Mariani wine stopped the digestion.

Acetate of lead does not retard or interfere with the action of the pepsin.

Tincture of chloride of iron, 30 drops, hardens the albumen and clumps it up, and retards about two hours; 5 drops retard about 15 minutes.

Salol retards the action about one hour.

Antifebrin only slightly delays the action.

Antipyrin had no effect.

Chalk mixture completely arrested the action (quantity added, a teaspoonful).

Calomel, no effect.

Bismuth sub carb., 20 grs., no effect.

Tincture of kino, copious precipitate of the pepsin and arrest of action.

Tincture of catechu, same effect.

Dr. CAILLÉ said he had several times expressed his opinion, and did not wish to take up the time of the section. He was well aware that milk is not scientifically sterilized by the boiling usually practiced. It was a well known fact that one child will thrive on undiluted milk, another on diluted. In view of the intricacy of the whole subject, he thought collective investigation would be a good way to solve the problem.

Dr. HUTCHISON thought Dr. Fowler would not get the same results if he were to repeat the same experiments. He had made six experiments with the best pepsins in almost the identical way Dr. Fowler had done, but his results had been very different in order of their merits. Parke, Davis & Co.'s was far below any experimented with. Fairchild Bros. & Foster's was found satisfactory. Pepsin is a very variable product, and little reliance should be placed on such experiments. No two specimens of the same manufacturer would give the same results.

He expressed his appreciation that different observers could come to similar results, referring to Dr. Baruch's statement as to the chemical analysis, showing the difference between human and cows' milk, and we know that it will nourish our babies in winter. But in summer our milk commences to ferment, and trouble begins. The boiled milk should be filled into a number of small vials, each of which is to contain only enough for one feeding. His experience would corroborate all that Dr. Meigs had said about adding cream to the milk, and he had carried it out for a number of years.

Dr. HARWOOD had been very much interested in the papers read, and very much surprised that in reference to artificial food nothing had been said about condensed milk. It was his experience and belief that of all the foods procurable none could equal condensed milk, for the reason that it had been heated to a temperature destroying any bacteria. Sugar has also been added. It has not been subjected to the churning process on the railroad that would render it unfit for continuous and regular feeding. In all his practice, extending over a number of years, all the children he had become responsible for had been nourished with condensed milk, and in his own personal experience and family, when the mother's milk failed, the baby was brought up on condensed milk. He had never failed to recognize the value of the addition of an alkali to milk, lime water being the one added, and the quantity used for diluting one-third that of the milk, and boiled. He had taken the trouble to visit Putnam County to learn the process of condensing before using it.

Dr. JACOB said he would strenuously object to condensed milk. Those who had done him the honor of reading his writings would agree with him.

In reference to the pepsin experiments he thought no one present at the meeting had ever given 30 drops of tincture of iron. Muriate of iron in small doses, though in large quantity during the day, does no harm. Whoever had given it in diphtheria would appreciate that fact.

One more point was of the greatest possible importance. Dr. Fowler had stated that the digestive process was interrupted by the carbonate of lime. That is important to know, though it is quite natural that it should do so and does it in the stomach. We give it to a sick child which does not secrete the normal amount of lactic acid, later

hydrochloric acid, and if you pour it into the stomach, digestion is interfered with. Alkalies ought not to be given immediately after eating; they will neutralize the normal acids after eating. Bicarbonate of sodium has different properties. When it is to be given it must be done before the administration of food. In an abnormal stomach there is an amount of abnormal fatty acids, and we give an alkali for the purpose of neutralizing these acids, and then it will do good. Give alkalies before food is taken, then the stomach is free from the fat acids. It is quite possible and physiological to give an alkali before meals, and still given pepsin afterward.

Dr. MEIGS said he was somewhat surprised to learn that diarrhoea was rare in hand-fed children in winter. In a foundling institution with which he is connected, one of the worst troubles is diarrhoea. Diarrhoea is not at all uncommon in winter, especially in improperly hand-fed children. Past clinical experience seems to be tending in this direction, that cows' milk should be diluted, and, also in favor of the addition of fat, say cream, which adds to the good effects. When he found that analysis of human milk would seem to show that dilution of cream to cows' milk was necessary, it seemed a strong argument, backed up by chemistry and clinical experience.

Dr. BARUCH said his statement as to the non-occurrence of diarrhoea in winter referred to the serious form; that occurring in winter is not often fatal.

Dr. MEIGS: A good many cases of death were from diarrhoea. They were children of the poorest classes of society, generally in bad health when first seen; they have diarrhoea when first admitted, and die.

Dr. BARUCH: As to condensed milk, I would like to ask the doctor how much water he adds.

Dr. HARWOOD: My method is, three teaspoonfuls of the condensed milk from the cans to a half pint of water; one-third of that water is lime water.

Dr. BARUCH: Condensed milk, even Borden's and the Swiss brand, would have to be diluted one-sixth if you dilute it as stated. Where would the nourishment come in? And you give a large amount of sugar likewise. I think condensed milk is the most pernicious food.

Dr. FOWLER: In regard to the value of these experiments. Those pepsins were bought out of the shops, and if they cannot digest any more albumen than appears here, they must be very weak. Saccharated pepsins would be still weaker. As to Parke, Davis & Co.'s pepsin, it was ascertained that it had been prepared by a new process, and had been only recently put on the market. The practical application of the results I leave to yourselves. It is well not to give these remedies during digestion. The curd that forms may set up conditions which may give you trouble.—*Dietetic Gazette.*

Progress of Science.

THE DIAGNOSTIC SIGNIFICANCE OF HEMATURIA.

Robert Saundby, M. D., Edinburgh, F. R. C. P. (Lond.), in the *British Medical Journal* writes: Hematuria is a symptom common to a number of pathological conditions which differ essentially in their seat, nature, and relationships. In many of these it is a prominent, in not a few of them the sole prominent symptom, while its differential diagnosis is beset with difficulties, not only from the multiplicity of causes, but from the fact that there are a certain number of cases which can only be attributed to causes still unknown, or at best very obscure.

Blood may appear in the urine in a corpuscular or non-corpuscular form. The latter is called hemoglobinuria to distinguish it from corpuscular hematuria.

Detection of blood in the Urine.—The diagnosis of the presence of blood coloring matter in the urine may be made by (1) the eye, (2) the microscope, (3) the guaiacum test, (4) the spectroscope; but the microscope alone is capable of differentiating hematuria from hemoglobinuria.

It has been maintained by Dr. Wickham Legg, an author who has written ably on several of the obscurer problems of clinical medicine, that the blood corpuscles get broken up after the urine is secreted. He maintains that if the urine is examined immediately after leaving the body, corpuscles can always be found. My own observations, which I have had the opportunity of making under the most favorable conditions, do not support this view. Hayem has found free hemoglobin in excess in the blood serum, while in the well known icteroid coloring of the skin and conjunctivæ, which sometimes appears, supports the view that the hemoglobin is set free in the blood before it appears in the urine. I shall have to refer to this matter again, and I believe I shall show that Dr. Wickham Legg is so far right that hemoglobinuria, as distinguished from hematuria, is not always present in the group of cases where chilling of the surface appears to be the essential factor in the production of attacks of bloody urine.

Having premised the necessity of microscopic examination for the differentiation of corpuscular from non-corpuscular hematuria, it may be broadly stated that blood in the urine, when in any quantity and chemically unchanged, presents a very characteristic appearance not likely to be overlooked or mistaken for anything else. But when the urine has remained some time in the bladder, the bright red color becomes changed to a dirty brown, giving to the urine a porter color if present in quantity or smoky tinge when in less amount. This change is due to a chemical alteration of the hemoglobin, which becomes

converted into methemoglobin by the action of the acid urine. Such dark urine may be confounded with that caused by other dark pigments, such as indican or pyrocatechin, which occasionally are present.

Unaltered blood in small quantity is not very visible; but by inspecting the urine in a glass with a good light we can recognize, not only its peculiar color, but its characteristic dichromism, that is, by reflected light it appears red, while by transmitted light it is green.

The microscopical search for blood is so well understood now by all practitioners that it needs few words. If traces only are present, the lowest stratum of urine should be examined after standing some time. The corpuscles undergo many changes in urine, swelling up so as to lose their biconcave form, or shedding their hemoglobin, by which they alter in shape, appear vacuolated, and ultimately colorless. Such colorless disks may possibly be confounded with discoid oxalates and torulæ, but both these are smaller, the latter containing bright nuclei and being generally oval.

The main purpose of this paper is to deal with renal hematuria, but the difficulties of differential diagnosis are so great, that I should be wanting in honesty if I dismissed as foreign to my subject those cases which depend upon other causes. I must, therefore, at the risk of trespassing upon your patience, attempt to grapple with the subject in its entirety.

I think I may content myself with the bare statement of the fact that the urine of women is bloody during menstruation, or whenever there is vaginal or uterine hemorrhage. Hemorrhage from the urethra may be caused by villous growth, or in consequence of local congestion or injury. The blood is bright red, appears independently of micturition, or is not mixed with the stream, but occurs at the beginning or end of it, and is often accompanied by local pain or other symptoms.

Hemorrhage from the bladder may be caused by stone, prostatic disease, villous or malignant growths, cystitis, ulcer, parasites (Bilharzia), etc. In stone, prostatic disease, and cystitis, the diagnosis is not difficult, as these conditions have well-marked symptoms. The first two can soon be excluded by physical examination, while parasitic ova may be recognized by the microscope. But ulcer and growths in the bladder present peculiar difficulties, which may long baffle diagnosis.

We may commence by excluding the kidneys. Hemorrhage from the renal substance reveals itself by blood casts of the urinary tubules, but hemorrhage from the pelvis has no such constant sign, though casts of the ureter may be found. Renal hemorrhage is usually accompanied by local pain, while the history of injury, a blow, passage of calculus, etc., may help. Hemorrhage from the bladder is usually associated with some degree of cystitis and local pain, frequency of

micturition, etc. By passing a sound or lithotrite, fragments of growth may be obtained or an irregular ulcerated surface detected. Washing out the bladder may afford useful aid in obtaining fragments of the villous growth.

In women urethral dilatation and digital exploration constitute a safe and easy method of examining the inside of the bladder, while in males, after due consideration, an exploratory cystotomy may be performed. Above all, in these cases medicine must seek the aid of surgery, and surgery of medicine, or grave errors of diagnosis and treatment will be made. This remark applies to many other forms of hematuria, as we shall see.

Renal Hematuria.—Sir William Roberts, whose admirable book on Urinary and Renal diseases is by far the most valuable work on the subject in this or any other language, divides the causes of hematuria into three groups: (1) local lesions; (2) symptomatic; (3) supplementary; and adds: "Cases also occur which are not referable to any of these categories of which the origin is extremely obscure." This is his list:

1. *Local lesions.* External injury, violent exercise, calculous concretions, ulcers, abscesses, cancer, tubercle, parasites, active or passive congestion, Bright's disease.

2. *Symptomatic.* In purpura, scurvy, eruptive and continued fevers, intermittent fever, cholera, etc., mental emotion.

3. *Supplementary or vicarious.* To menstruation, hemorrhoids, asthma.

In one or two instances these may refer to other than real lesions, but the list is a useful one to modify and extend for our purpose, thus:

1. *Local lesions.* External injury, twisted or movable kidney, calculus, tubercle, cancer, syphilis, embolism, parasites, congestion, Bright's disease.

2. *Symptomatic.* Blood diseases (purpura, scurvy, hemoglobinemia, leucocythemia) specific fevers, malaria, cholera.

3. *Toxic.* Turpentine, cantharides.

4. *Neurotic or vicarious.* Hysteria, insanity, asthma, menstruation, hemorrhoids.

External injury causes laceration of the kidney substance, which, if extensive, may call for extirpation of the organ; in most cases the wound heals, and recovery takes place. The diagnosis presents few difficulties, and the treatment must depend upon the amount of hemorrhage, which, if great, will cause a tumor in the flank from effusion into the neighboring tissues. The treatment must be rest, an ice-bag to the part, ergotin subcutaneously, and in the last resort extirpation.

Movable kidney. Closely connected with the foregoing are cases of persistent or intermittent hematuria dating from a blow or fall. It is supposed that the organ is partially displaced and rotated on its horizontal axis, so as to twist the vessel at the hilus, thus compressing the vein, and causing passive congestion.

The employment of an efficient bandage is of the utmost importance for the successful treatment of these cases. The following description of a suitable appliance is from a paper by Dr. Apolant (*Deutsches Med. Woch.*, No. 41, 1886):

"The bandage used to reduce the kidney was simply a belt fitted to the abdomen, with appendages of India rubber webbing, so arranged as to grasp the hypochondrium. To prevent its slipping up, two covered India-rubber gas tubes secured it to the thighs. Inside the bandage, in a position somewhat below the normal position of the kidney, a firmly padded convex leather cushion, somewhat larger than the fist, was fixed, which exercised pressure on a considerable area of the abdomen over the very yielding intestines. This pressure, while being pretty strong and constant, must be of such a nature that the abdomen can expand and contract during breathing. This is effected by the India-rubber."

Calculus. A medical friend of gouty habit, and a great sufferer from oxaluria, was getting into his brougham one day, when his horse started and flung him on the back seat in such a way as to bring on an acute pain in the left loin, as if he had strained a muscle. Later in the day he vomited, and the pain was so great at night that he took opium to relieve it. The urine became bloody. In the course of twenty-four hours he passed a small oxalate of lime calculus, and his trouble ceased. This case shows that hematuria after a strain or blow may be caused by the displacement of a calculus, which had formerly occupied some position in which it gave rise to no symptoms. Had the stone not passed, the cause of the hemorrhage would have remained obscure, or it might have been put down to partial displacement of the kidney. The symptoms of renal colic are tolerably characteristic. The pain shooting down towards the groin, with vomiting, and retraction of the testicle, are not met with in any other condition. It is noteworthy that the pain in biliary colic does not pass downward to the abdomen, but radiates round the thorax, and is specially localized at a spot below the right shoulder blade. A medical friend, whom I recently attended for biliary colic, tells me that the worst pain of all was a feeling as if three or four vertebrae were being gripped by a pair of pincers. Confusion between these two conditions is impossible if hematuria is looked for and relied upon, as I believe it may be, as a constant symptom of renal colic, but it may not always be present in quantity sufficient to reveal itself to inspection with the naked eye. Conversely I hold that the diagnosis of calculus in the kidney is incomplete until hematuria has occurred.

It may be contended that the negative results of operation do not absolutely exclude calculus. In a case, treated at one of our hospitals I believe, a stone was passed *per vias naturales* after an exploratory incision had been made without success, so that we must allow that even surgeons are fallible, and we know that a stone of small size may give

rise to marked symptoms without getting into the infundibulum.

Tubercle. Hematuria in tubercle is accompanied by pus and shreds of renal tissue. Tubercle most commonly causes pyelitis, and there is much more pus than blood in the urine. The diagnosis of tubercle depends mainly on the evidences of tubercle elsewhere and on family history.

Cancer. Hematuria is not always present in cancer; when it is, it is very profuse. The diagnosis in some cases is easy, as a tumor may be felt, and deposits in other organs can be made out. Microscopic examination may show characteristic cells, but this can not be relied upon. In some cases the differential diagnosis from calculus is very difficult. The hemorrhage is, perhaps, more profuse and persistent. The subjects of cancer may last a long time in fair health; one patient of mine had suffered from hematuria for four years before I saw him, and lived quite two years afterward. Mr. Chavasse made an exploratory incision, under the belief (which I shared) that he had a calculus. He recovered from this and died some time afterwards, the *post mortem* examination, proving that calculus was not present, and showing cancer of the kidney and liver.

Syphilis. Gummatous deposits in the kidneys are well known in the *post mortem* room, but their clinical phenomena have not been fully made out.

Embolism. Embolism of the kidney is not an uncommon accident in heart disease, especially in vegetative endocarditis, also in pyemia. Hematuria occurring under these conditions may safely be attributed to embolism.

Parasites. Hydatid cysts in the kidney cause hematuria, and can only be recognized by the passage of fragments of hydatid membrane in the urine. Bilharzia hematobia, which generally attacks the bladder, may occur in the pelvis or substance of the kidney, and manifest itself by the characteristic ova and embryos in the urine.

Congestion. Congestion may be active or passive. Active congestion is often only the initial stage of acute inflammation, a condition which very rarely attacks healthy kidneys, except during the course of acute specific diseases; for example, scarlatina, diphtheria, tonsillitis, typhoid fever, etc. But such congestion also occurs when the functions of the skin are seriously interfered with, as by extensive burns, or more commonly by chilling of the surface, as in bathing, exposure to cold, etc.

A few years ago a young man consulted me, saying that he believed he was passing blood. He had been to a swimming bath, and after returning home noticed his urine was bloody. This was on Saturday, and on Monday, when I saw him, the urine contained only a trace of blood. By Wednesday the urine was normal. This patient told me that his brother had consulted Dr. A. H. Carter for hematuria following exposure to wet after playing foot-ball.

Passive congestion. Venous engorgement, consequent upon liver, heart, or lung disease, may

cause slight hematuria. The condition is easily understood and readily recognized.

Bright's Disease. In acute nephritis more or less hemorrhage occurs, and persists throughout the acute stage. The diagnosis depends upon the other evidences of Bright's disease; for example, dropsy, and the presence of epithelial casts in the urine. In chronic Bright's disease hemorrhage is not constant, but may occur at any time. The amount is usually moderate, but in rare instances may be alarmingly profuse and fatal. The recognition of the nature of the case depends on the presence of casts in the urine and other confirmatory signs, such as polyuria, low specific gravity of urine, cardiac hypertrophy, high arterial tension, albuminuric retinitis, etc.

Symptomatic Hematuria. Hematuria occurring in connection with specific diseases, such as yellow fever, malarial fever, and cholera, or in the course of blood diseases, such as purpura, scurvy, and leucocythemia, depends for its correct diagnosis on the recognition of these diseases, each of which possesses well-marked symptoms and definite clinical relation. But this is not the case with hemoglobinemia, which demands special attention. This condition consists essentially in the dissolution of the red blood corpuscles in the body, and the presence of free hemoglobin in the liquor sanguinis. Under these circumstances the hemoglobin escapes through the Malpighian tufts, and appears in the urine. The determining causes of this change are not clearly known. Certain poisons have this property of breaking up the blood corpuscles by direct action upon them. In certain septic conditions, puerperal fever, pyemia, etc., hemoglobinemia occurs. Physiologists now believe, but it is not formally established, that the red blood corpuscles are broken up and converted in the liver into bile pigment. It is supposed that in disease this process is interfered with, the destruction taking place in excess of the power of conversion, or the process stopping short at the stage of destruction. Paroxysmal hemoglobinuria occurs as an independent disease.

It is noteworthy that many of the reported cases of hemoglobinuria have been ascribed in their first onset to a fall or blow on the back, though a chill is always the determining cause of subsequent attacks. The disease has been said to depend upon syphilis, but in what way is not explained. The strongest argument in favor of this doctrine is that one patient lost his liability to attacks on anti-syphilitic treatment. But the force of this is modified by the knowledge that though some cases are very obstinate, others recover of themselves. One case specially is known to me in which no attack has occurred for several years, though no special treatment has been followed, except care to avoid as far as possible exposure to chills.

It is worth bearing in mind that albuminuria is occasionally persistent in these cases, and Dr. Rafle believes that this is due to a permanent

inability to dispose of the albuminous material set free by the destruction of the red blood corpuscles. But if this were true the albumen excreted should be globulin, not serum albumen, a suggestion already made some years ago by Sir William Gull; and I have endeavored to test the truth of hypothesis, but my analysis always showed that serum albumen was present as well as globulin. I should be very glad to see this point investigated by so competent a chemist as Dr. Rafle.

Toxic Hematuria. Hematuria may follow the application of a fly-blister, or the internal administration of cantharides. The latter is seldom practised, but the drug has been recommended on quasi-homeopathic principles by Dr. Sidney Ringer for nephritis, and in that condition I have seen it even in one-minim doses cause distinct hematuria. When given for criminal purposes the dose is usually large, and the hematuria is accompanied by strangury, vomiting, and symptoms of irritant poisoning. Turpentine does not usually cause hematuria, though the readiness with which the violet odor appears in the urine shows that it is absorbed and excreted by the kidney. I have had one very interesting example of hematuria due to this cause, in a varnish maker who was sent to be examined for life insurance. He seemed a perfectly healthy man, but after he had gone I examined his urine, and found it contained a little albumen. I then noticed the odor of violets, and closer examination showed that albumen was due to the presence of blood. There were no other evidences of renal disease, but there was certainly some special susceptibility to the action of turpentine, as this gentlemen informed me that he was not personally engaged in the manufacturing process, though he was much about the factory. I tried to follow up the case, but could not, as he abandoned the proposal.

Narcotic and vicarious Hematuria. I have no personal experience of these conditions. Laycock (*Nervous Diseases of Women*, p. 229) mentions hematuria as not uncommon in hysteria, but I have not yet recognized a case, though I have certainly met with one or two cases of hematuria in women which I have not ventured to class in this paper. Sir W. Roberts mentions menstruation, hemorrhoids, and asthma as conditions in which vicarious or supplementary hematuria occurs, but I can only quote him, and leave the matter without further comment, as I have never met with such cases. Dr. G. H. Savage states that hematuria may occur spontaneously in acute mania and general paralysis.

Treatment A very few words as to the general treatment, which must be specially regulated in each case by the cause. Undoubtedly hematuria usually passes off by rest, after a shorter or longer time, independently of drugs. But, as we have seen, there are persistent cases in which we are bound to do our best, and ample opportunity is afforded for trying all known remedies. My ex-

perience has been that they are all very untrustworthy, and I hesitate to give the preference to any one. Acetate of lead, ergot, hamamelis, gallic acid and perchloride of iron should have a fair trial. In hemoglobinuria a ten-grain dose of quinine should be given at the commencement of the attack, and five grains three times a day, till convalescence is established. Chloride of ammonium, recommended by the late Dr. Warburton Begbie, has never been followed in the hands of others by the fortunate results he obtained.—*British Medical Journal*.

REVIEW OF THE RECENT PROGRESS OF ELECTRICITY.

BY CHARLES H. MERZ, A.M., M.D., SANDUSKY, O.

Columbus Medical Journal.

The object in writing this paper is to give a concise outline of the present state of knowledge of electro-therapeutics, and to serve as an article for reference on the subject.

The main facts concerning the application of electricity to the cure of disease have been collected from reliable sources, and are arranged in alphabetical order without any unnecessary explanations.

Particular pains have been taken to state the strength of the current in milli-amperes whenever possible, as accurate current measurement is absolutely necessary to the scientific use of electricity. Many writers speak of using twenty-five and thirty cell currents about the brain, which would be impossible if such battery were generating the current it should. But few patients can tolerate a current of more than two to five milli-amperes about the head. This fact alone would make it desirable that a definite strength be established for each condition—thus making the dosage of electricity uniform.

The strength of a current may be roughly estimated without a milliamperemeter by placing the needles in some white of egg. Robin states that a current of 45 milliamperes causes coagulation of the albumen in twenty to thirty minutes. This is a practical test that can be made under any and all circumstances.

Acne.—An inflammatory, usually chronic, disease of the sebaceous glands, characterized by papules, tubercles or pustules, or a combination of these lesions, occurring for the most part about the face (Duhring).

Bartholow (*Med. Elec.*, p. 228) has obtained good results from the use of galvanism in this and many other affections of the skin. He stimulates the entire surface of the face, paying little attention to the direction of the current. A current of 2 to 3 *milli-amperes* is found most suitable. After the immediate effects, which are irritating, have passed off, the skin becomes pale and the eruption less prominent. One

electrode may be passed over the face while the other remains on the nape of the neck. Fox uses a small metal button applied to the red blotches, which remain after evacuation of the contents of a nodule. In *acne rosacea*, when dilated blood-vessels are present, treatment with the electrolytic needle has given good results (Duhring and Stelwagen, *Am. Sys. Med.*, page 649). The positive electrode is held in the hand, and a fine needle attached to the negative is applied to the small vessels. Two to six *milli-amperes* may be employed, being governed by the amount of pain and destruction caused.

Amaurosis, amblyopia, anemia of the optic disc, and other diseases arising from anesthesia of the retina, have yielded excellent results under the use of electricity. Anemia should be treated by galvanism and hyperemia by faradism. Applications should be made directly to the eyes—the anode resting on the closed lids and the cathode on the malar bone or temple (Bartholow). A current of two milli-amperes will usually be found of sufficient strength. It may, however, be increased until faint flashes of light are seen, but should not be continued for more than two or three minutes. When faradism is employed the current should be rapidly interrupted and no stronger than is comfortable.

Amenorrhœa.—May be either an interruption or habitual non-appearance of the menstrual discharge. May occur with plethora, from disturbance of ovarian or uterine function, or with anemia and debility. The greater number of cases are met with in anemic females.—(*Hartshorn's Prac. of Med.*) Galvanism, faradism and franklinism are employed. Electricity is especially valuable in young women, where the menstrual function is not fully established, on account of a torpid state of the vaso-motor nerves of the ovaries and uterus, and also where the catamenia have been suppressed after labor, or in consequence of a sudden chill or emotion.—(*Golding Bird, Quarterly Epitome.*)

Anesthesia.—May arise from various causes—lesions of the brain and spinal cord, division of a nerve supplying a certain part, the results of exhausting diseases, etc. The sense of touch may remain, and the sense of pain be lost, or vice versa. When sensory functions are diminished we have anesthesia increased, hyperesthesia. In most cases removal of cause is the principal element in the cure. The faradic current is most suitable. Dry the skin, and dust with some drying powder, and apply the current by means of the wire brush or metal electrode for about ten minutes daily. The stable electrode, well moistened, should be applied at some indifferent point. A strong ascending galvanic current, 15 to 25 milli-amperes, may do good where there is languid circulation.

Angioma.—Dr. Alvarez speaks favorably of electricity in the treatment of angioma. The positive electrode is plunged into the tumor,

whilst the negative is moved about over the mass externally, or as near to it as possible. He gives good results in a large number of cases. The current strength may vary between 10 and 40 milli-amperes, according to the sensations and effects produced.

Aneurism.—In the treatment by electrolysis coagulation is the end sought. For aneurisms of any size, both poles and a large number of needles that are insulated should be used. Strength of current, about 45 milli-amperes. Current should be allowed to flow for some minutes.—(*Beard.*) The advantage in using two needles is that a double clot is formed and the resistance is less. Cisnicelli records 37 cases of aortic aneurism with 6 cures. Petit gives 114 cases of thoracic aorta, with 96 benefited, 38 deaths and 45 failures. Robert Abbe uses coils of wire, inserted in the aneurism after Barwell's method. The galvanic current is allowed to flow through the wire. The reason there are so few good results is that operative procedures are delayed until the sac is almost ready to burst. Coagulation is more certainly secured by this method than by catgut or horsehair alone. No suppuration or embolism ensues, and a firm clot is formed.

Asthma.—Probably a purely functional neurosis, as the organs present no characteristic anatomical changes. In cases of long standing, the evidences of chronic catarrh are due to the secondary affections. Owing to its neurotic origin, Eade (*Brit. Med. Jour.*) recommends galvanization of the neck. One pole is placed just below the angle of each jaw and in front of the sterno-cleido-mastoid. I have been unable to ascertain the exact strength of current employed, but he uses one strong enough to be felt, probably 20 milli-amperes would be sufficient. Bartholow (*Med. Elec.*) recommends systematic galvanism in the intervals between the seizures. Ranney recommends drawing of sparks from the anterior and posterior surfaces of the chest by means of the static machine (*Elec. in Medicine*). The induced electrical current has been used by Schaeffer as a means of cutting short the paroxysms. Place one pole at the angle of each jaw in front of the sterno-mastoid, so as to cover the course of the pneumogastric and sympathetic; the current strong enough to be felt passing through the neck. Apply 15 minutes twice a day for six days; twelve sittings usually affording relief. At first there may be dilatation of the pupils, but this is followed by contraction as improvement follows. (*Geddings, Am. Sys. Med., vol. iii.*)

Breast, tumors of—Under this head are classed such growths as are not carcinomatous, chronic mammary tumor (adenoma), cysts; fibromata, enchondromata, osteomata. Galvanism is the current most suited to the treatment of these tumors. It is essential to successful treatment that they be discovered early, while yet small.

Surface applications are indicated. Large, soft, well moistened electrodes should be applied to both sides of the tumor, and so placed as to permeate mainly in the direction of the axilla. A current ranging from 10 to 50 milli-amperes may be used at each *seance*. No exact rule can be laid down, as the resistance varies greatly. Of 186 tumors treated after this manner by Dr. Garret, of Boston, 157 disappeared entirely and permanently.

Bullets, detection of—Instruments necessary, telephone, suitable shaped metal probes, insulated nearly to the tips, and a small, steel ball with necessary connecting cords. In the apparatus as perfected by Dr. J. H. Gardner, of Boston, no battery is used, the patient's body being made to furnish the current. The ear-telephone is flat in shape, and is held in apposition to the surgeon's ear by an elastic head band or metal frame, thus leaving both hands free for work. One pole of the magnet in the receiver is connected with a small, steel ball, which the patient holds in his mouth and the other end to the probe. The probe when passed into sinuses or bullet tracks gives no sound unless it comes in contact with some metallic substance, when the current is completed and a decided "click" is heard in the instrument. The telephonic probe is destined to play an important part in the department of surgery, as it is sensitive, reliable, and at the same time compact and inexpensive. Any telephone constructed on the Bell principle (electro-magnet and metallic diaphragm) will serve to transmit the sounds to the ear. (*Vide Ganot's Physics, p. 884.*)

Cataract.—Recent advances in electro-therapeutics have led to the use of the current in this affection. The action of electricity is three-fold—mechanical, tonic and catalytic; tonic from its action on the sympathetic and pneumogastric, catalytic from its electrolytic action. "In all cases in which the disease is progressive, as indicated by the fat granules and nebulae, where electricity is well borne, where the choroid and retina are not greatly degenerated, and where there is no complication of cirrhosis of the kidneys or liver, diabetes or organic disease of heart or lungs, improvement may be expected." The negative electrode should be placed on the eye, and the positive on the nape of the neck, jaw or stomach. A current of two milli-amperes will be sufficient for most cases, though no rule can be laid down. This may cause vertigo. A current of this strength may be applied for five or six minutes daily. Faradic current, negative to the nape of the neck or in the hand of the patient, and positive to the eye, by means of a moist sponge or the fingers. Use a weak current for five, or ten minutes daily.—(*Kidder.*)

CORD, SPINAL.—Acute inflammatory conditions should not be treated with electricity. When the disease has assumed a chronic type, galvanism is of more service than the faradic or static

currents, probably on account of the depth of tissue affected. The various complications of the disease, rectal and vesical irritations, incipient caries, paralysis, etc., may often be greatly relieved by galvanism. The current strength varies from five to eight milli-amperes, and the applications should be made daily. Occasionally a current of twelve milli-amperes will be found necessary in chronic cases. Points of tenderness should be sought and galvanized separately.

Fibroids.—From July, '82 to July '87, Apostoli made 5,201 applications of the continuous galvanic current for the following affections: Fibroids of the uterus, polypi, entire or partial hypertrophy of the uterus, subinvolution, acute and chronic endometritis, ulceration of cervix, periuterine inflammation, ovaralgia, ovaritis, salpingitis, tubular cysts, atresia, and hematocele. The 5,201 applications were made on 403 patients. Of these he lost two, and had ten phlegmons, which he excited or aggravated.

Fistula, Anal.—Ciniselli reports a case in which all manner of cauterization had been employed. An elliptical ulcer was found on the right margin of the anus one and one-half inches square. He cauterized it superficially with a current of fifteen milli-amperes for fifteen minutes, with the result that in one week there was less pain and tenderness, and cicatrization had commenced. One week later cicatrization was complete and all pain gone. Numerous cases of a similar nature have been reported, establishing the value of electricity in this condition.

Galvanization.—Central.—Dr. Beard recommends that the cathode be placed over the epigastrium. The anode is to be stroked over the forehead, with a current of about two milli-amperes, for two minutes; then to the cranium for two minutes; afterward moved up and down the neck for a like length of time, and finally applied up and down the spine for about ten minutes. This method gives excellent results in the various forms of nervous dyspepsia, gastralgia, hysteria, hypochondriasis, etc. When the current is transferred from the brain to the spine it may be increased somewhat—running up to five and eight milli-amperes.

Hematocele of tunica vaginalis.—Apostoli recommends galvano-puncture as being quick and exerting a surgical and medical effect.

Hemorrhage.—Post-partum.—It is possible by means of the faradic current to keep up contractions of the uterus for hours. One electrode may be applied at the symphysis pubis and the other moved about over the abdomen.

Hernia.—But few cases of the application of electricity to this condition are recorded. Dr. Craft, of Cleveland, reports a case in which a needle, properly insulated except at the point and attached to the positive pole, was introduced subcutaneously between the external and internal rings and a current sufficient to excite adhesive

inflammation allowed to pass. Care must be taken to keep the needle external to the peritoneum and not to injure the cord. The operation resulted in a cicatricial sealing of the inguinal canal.

Hydrocele.—Excellent results have been obtained by electrolysis by Rodolfi, Erhardt, Frank, and Bartholow. Two insulated needles are introduced into the sac and brought within half an inch of each other, when the current is turned on. Signor Macario (*Gaz. Med. Ital. Lombard No. 36*) reports two cases cured by the single application of a current one minute. In both cases the fluid disappeared entirely in 24 hours, though no fluid escaped from the needle puncture. A current of 20 to 30 milli-amperes may be used, being guided largely by the sensations experienced by the patient.

Hypertrichosis.—Place patient in a suitable position and light. Have a suitable galvanic battery. Moisten sponge electrode attached to the positive pole and a platino-iridium needle or jeweler's brooch attached to the negative by means of a suitable handle. The needle is inserted as near as possible into the hair follicle and the circuit completed. After a sufficient length of time the circuit is opened and the needle withdrawn. The hair is permanently destroyed. Hays (*St. Louis Med. and Surg. Journal*) uses 5 to 10 zinc-carbon cells and a cambric needle, allowing the current to flow 15 to 20 seconds. Hardaway (*Phil. Med. Times*) used 8 cells and a No. 13 cambric needle. Fox (*N. Y. Med. Record*) prefers 10 to 16 cells of zinc-carbon battery and fine flexible steel needle. Amory (*Boston Med. and Surg. Journal*) thinks a fine gold needle the best and 20 seconds sufficient as to current strength. Luskartin (*Wein. Meiz. Wochenschrift.*) uses $\frac{1}{2}$ to 1 milli-amperes from 20 to 30 seconds. Michelson (*Niertel Jahrschrift. fuer Dermatologie*) used 3 milli-amperes. Baratoux required 5 to 8 milli-amperes, and Brocq needed from 10 to 25 milli-amperes. I have found, after a large number of experiments, that a jeweler's fine brooch is the most suitable needle, and that a current of 3 milli-amperes for 30 seconds is sufficient to destroy the coarsest hair, while one rarely needs a current greater than 2 milli-amperes if continued long enough.

Induction Balance.—Principle first applied by Babbage, Hershell and Dove. The instrument devised by Prof. Hughes (*Vide Ganot's Physics*, p. 848.) is the most complete, and offers to the physicist, or physician, a powerful instrument of search. The apparatus consists of two primary coils, each containing 200 meters of No. 32 silk-covered copper wire, and two secondary coils, all four being exactly alike. The two primary coils are joined in series with a battery of three or four Daniell's cells, in which a microphone is also inserted; the current being broken by the ticking of a small clock. The secondary coils are connected with a telephone in such a manner that

their action upon it is opposed. In winding the coils it is found almost impossible to get an exact balance. Adjustment between the secondary and primary coil is made by a micrometer screw. When this is accomplished there is silence in the telephone, but if any metal is introduced in one of the secondary coils a sound is heard at once. This principle has been made use of in the detection of metallic substances buried in the body; but while the substance is always detected, it is not accurately located, and the results from the use of the instrument have not been of the most satisfactory nature.

Intestinal Obstruction.—In invagination, faradic currents have effected cures. Cases are reported by Bucquoy (*Jour. de Therapeutique*) and by Ballouhey (*These de Paris*) of cures by the galvanic or faradic currents. In the use of the galvanic current peristalsis is probably started from the point of application, while faradism probably acts by forcibly contracting that part of the canal reached by the current, and the consequent traction exerted upon the invaginated portion (*Bartholw*). One pole should be placed in the rectum and the other passed over the abdomen. Direction of the current is unimportant.

Lactation.—The faradic current has given good results in undeveloped glands after parturition. In one case reported by Aubert (*London Med. Record*) two applications gave a free supply. The static spark is recommended as being more reliable, but faradism will do well. Both breasts should be included, and the treatment should be instituted promptly to be successful. Becquerel relates a case of a young woman who, after eight days suppression, was able to nurse her baby, and in whom the quality of milk was improved. Pierron relates a large number of cases in his practice in which electricity either re-established the function after suppression, or induced it when absent after normal labor. In my own practice I have found galvanism, a current strength of four to six milli amperes, and faradism alternately to be a very satisfactory method of treatment. The anesthesia usually present rapidly decreases.

Larynx, Papilloma of—May be successfully removed by means of the galvano-cautery. It is well to produce local anesthesia by means of a strong solution of cocaine. The cautery point should be at a white heat, and placed *in situ* before the current is turned on. The amount of battery power required for any particular electrode may be ascertained beforehand. Leave electrode in contact with the growth for a few seconds only. In a few days the growth will drop off if properly cauterized.

Liver, hydatid cysts of.—Capillary electrolysis is recommended as one of the new methods of treatment. In this method, the needle is replaced by a canula which remains free. There is no pain. By the partial coagulation of the fluid, a more efficient chemical action takes place.

During the passage of the current, it permits of the escape of the gaseous froth. It destroys the hydatids and changes the living into an indifferent substance which solidifies and retracts. Finally it obtains the cure of the cyst without subjecting the patient to a serious operation. (M. H. Heurot, *Jour. de Med. de Paris*, Oct. 11, '82.)

Lupus vulgaris.—The ulcer and surrounding integument should be washed carefully with soap and water. The application may be made by means of a flat silver plate, set in a rubber ring to prevent action on the healthy tissues. This is attached to the negative pole. A current of from 5 to 10 milli-amperes is employed for ten or fifteen minutes. In this manner the electrolytic action is confined to the diseased parts. Under the influence of the current, the lupus nodules become excoriated and swollen, and give vent to a clear, watery, sticky fluid. After a few hours they sink out of sight. They may be dressed in iodoform for eight or ten days. The result is a pigmented cicatrix. This method of treatment is applicable to the ulcerating and non-ulcerating forms. (*Vide Weiner Med. Wochenschrift*, Nos. 27, 28.)

Metritis and Endometritis.—Metritis, hyperplasia of the connective tissue of the uterus combined with increased sensibility. In a paper by Apostoli (*Jour. Am. Med. Assoc.*, Vol. 8, No. 19), the application of electricity in these conditions is fully treated. A medical galvanometer for intensity divided into milli-amperes should be included in the circuit. Of permanent batteries, the Leclanche cell is recommended. The intra-uterine electrode should be large enough to reach all parts of the uterine cavity and have a glass muff to protect the vagina. The electrode should be of platinum. A neutral or insensible electrode, which is applied to the abdomen, allows of the use of the intense current without pain or heat. The cords should be of good conducting material. Precede the applications with a vaginal antiseptic injection. "Singe and disinfect" the electrode and introduce it carefully with the current turned on. Cauterize the cavity thoroughly in all hemorrhagic cases, less thoroughly in others. After two or three applications the intensity must be increased, reaching 100 to 200 milli-amperes. Apply for five or ten minutes. These applications should be made every week, and every second day if necessary, and should be followed by a rest of several hours in bed. This treatment, it is claimed, induces a new form of intra-uterine mucous membrane and forms an intra-uterine exudation.

Myoma.—Martin, in a paper read before the Ninth International Congress, speaks of the treatment of myoma by electricity. Local effects of the poles should be borne in mind, *i.e.*, that acids collect at the positive and alkalies at the negative. A current possessing intensity rather than volume is desired. The current exercises

an atrophic effect—not electrolytic action alone, that produces the desired end. The elements being separated an electrolytic action takes place and absorption follows. Caustic effects are not desired and there is no galvano-puncture, as in Apostoli's treatment. A current of more than 100 milli-amperes is never used. This method of treatment is claimed to be devoid of danger, painless, checks hemorrhage, reduces the size of the tumor and admits of accurate dosage. (*Med. News*, Vol. 51, No. 2.)

(*To be continued.*)

THE THERAPEUTICAL VALUE OF BISMUTH SALICYLATE.

Dr. Hale (*Polyclinic*) says :

In an experience extending over two years, with its use in treatment of inflammatory affections of the gastro-intestinal tract, seldom has it failed to accomplish the desired result and permanently cure the disease. In severe cases of diarrhea occurring in phthisical patients, I have effected diminution in the number of stools by half dram doses of the drug at intervals of two hours, reducing the amount of the dose on the amelioration of the symptoms. In cholera morbus, after the cause has been removed, this agent will reduce the existing inflammation and induce a cessation of the morbid action.

In dysentery, acute in character and of the sporadic variety, it has proved efficacious when full medicinal doses have been administered, allaying the disorder with great rapidity.

The diarrhea accompanying enteric fever, especially in children, I have been able to control by its use, when other well known remedies for this disorder had failed. If impossible to administer by the mouth, an enema may be employed, but in that case, the amount should be double that given by the mouth; and it should always have a small amount of opium administered with it.

In dyspepsia, with acid eructations and pyrosis, with a feeling of heaviness at the stomach after the ingestion of food, bismuth salicylate, in combination with simple bitters, soon tones up the organ and relieves the disorders. Recently, Dr. James Ware, of Lake Charles, La., communicated to me the following cases in which he had found the preparation useful :

1st. Female, æt. forty-five, dysentery. At the end of five days of treatment with opium and so on, I gave : R.—Bismuth salicyl., gr. c.; bismuthi subnit., gr. c. M. Ft. pulv. No. vj. div.

Gave one powder every three hours. The woman was entirely relieved in twelve hours.

2nd. Female, æt. twenty-three, dysentery.

Gave salicylate as above, also by enema, thus : R.—Bismuthi salicyl., gr. cc.; glycerinæ, f 3 j; aquæ, f 3 vj. M. Sig.—f 3 i, in three ounces of tepid water, after each stool.

Woman was well in forty-eight hours.

3rd. Child, æt. three; never fully recovered from an attack of cholera infantum last summer. Relieved by salicylate in eight grain doses.

4th. Male, æt. twenty-five; periodical fermentation of contents of bowels every ten or twelve days for a year. Relieved now at the beginning of every attack, by fifteen grains each of the bismuth salicylate and subnitrate.

5th. Female, æt. twenty; pruritus vulvæ. Suffered terribly for several days. Used corrosive sublimate, carbolic acid, and other remedies with no benefit; then employed : R.—Bismuthi salicyl., gr. c.; aquæ, f 5 iv.

As a vaginal injection; relief instantly.

6th. Female, æt. fifty-six. Fermentation of contents of stomach and bowels every ten, twenty or thirty days for twenty years, accompanied with violent pain and frequent discharges of acid mucus. Relief generally came in from thirty to seventy-two hours. In the midst of an attack I gave ten grains of salicylate, and subnitrate, with immediate relief. She has taken this amount night and morning for thirty days, with no return of the disease.

The preparation of this drug I have used is a pure white, very flocculent and light material. In beginning the treatment of any inflammatory affection of the alimentary canal, full and decided doses should be administered, and subsequently, when decrease in the severity of the symptoms takes place, the amount may be lessened. In severe cases occurring in children, I never commence treatment with a dose less than five to eight grains.

The formula I prefer in cholera infantum and many other diarrheal disorders in children is the following : R.—Bismuthi salicyl., 3 ij.; tr. capsici, gtt. xij.; spts. ammon. aromat., f 3 iss.; pulv. acaciæ, 3 ij.; aq. cinnamoni, q. s. ad., f 3 ij. M. Sig.—Teaspoonful every two hours, for a child from three months to one year of age.

In the adult I prefer to use the preparation in powder, or combined with some other astringents, as tannic acid, acetate of lead, etc. With the bismuth salicylate it is possible in many instances to entirely dispense with an opiate, and this I always endeavor to do if possible.

The beneficial action of this drug is undoubtedly due to the antiseptic power of the salicylic acid as much as the astringent properties of the bismuth. In many cases of vomiting it will control it if given in five grain doses, also in pregnant women the vomiting in many instances may soon yield to the action of this preparation, and its return to any great extent will be prevented by its continuance in small and frequently repeated doses.

PEPPERMINT WATER IN PRURITUS PUDENDI.

DR. AMAND ROUTH calls attention to the value of peppermint water in pruritus pudendi. In pruritus, due to pediculi, ascarides, an irritable urethral caruncle, an endocervical polypus, early cancer of the cervix, distension of Bartholini's ducts or glands, the leucorrhœa of vaginitis, endocervicitis, and metritis, or the irritating discharges of advanced carcinoma uteri, or to a gouty or diabetic diathesis, peppermint water excels all others, cocaine inclusive, in affording relief, whilst endeavors are being made to remove the cause. The agent here alluded to is peppermint water used as a lotion. The B. P. preparation answers well, but is bulky for carrying about, and is incapable of concentration unless rendered alkaline. This is best done by borax, as being in itself soothing and antiseptic. Patients can easily make their own lotion, as required for use, by putting a teaspoonful of borax into a pint bottle of hot water, and adding to it 5 drops of oleum menthæ piperitæ, and shaking well; the parts affected to be freely bathed with a soft sponge. If no cracks or sores are present, this lotion will remove the itching; but if there be eczema or a rawness from scratching, it is inapplicable. Olive oil, with 5 grs. of iodoform to the ounce, is then more useful. The greatest and most permanent relief is afforded in the neurosal form, especially in the pruritus which often accompanies pregnancy. It is also very useful in the pruritus which occurs at the climacteric, or in elderly women, in whom it may be only part of a general pruritus, and also in those cases of women of all ages, where the urine simultaneously becomes of very low specific gravity without any evidence of having a gouty or granular kidney as a remote cause.—*Brit. Med. Jour.*, April 14, 1888.

ELECTRICITY IN THE TREATMENT OF FIBROIDS OF THE UTERUS.

(By Maria B. Werner, M.D., Philadelphia, Pa.)

The use of electricity in the treatment of fibroids has, until within later years, been more or less in the hands of charlatans, their accidental good results induced many inquiring and scientific minds to investigate its therapeutical value, and endeavor to place it before the profession as an agent whose known quantities produce definite results. While this latter still presents many sides for improvements, all will agree that a steady advance has been made in this study.

About 1870, Dr. Cutter began to use the galvanic current for uterine fibroids. The patient was placed under the influence of an anæsthetic, and the electrodes were introduced through the abdomen, deeply into the growth (three to four inches), but not allowed to approach each other. The application lasted from three to fifteen minutes, the operator being guided by the systemic symptoms. The intervals were usually from one week to a fortnight, but it has been repeated every day for one week.

In the February number of the *American Journal of Obstetrics* for 1887, Dr. Cutter has given a statistical report of fifty cases; eleven cured, three relieved, twenty-five arrested, seven not relieved, and four fatal. These results may seem encouraging, but the method seems not entirely free from danger, almost the first thought being a possible wounding of the intestines or bladder and while this might be avoided by careful percussion, the chances for a sharp attack of peritonitis seem to require courage as an indispensable factor.

In 1878, Dr. Semeleder modified Mr. Cutter's treatment by using *one* puncture through the abdomen, the other being thrust either through the vagina or rectum into the tumor. The treatments lasted five minutes, and were repeated from every seven to fifteen days. There were reported at that time fifty cases, thirty-four of these were ameliorated; in a certain number the tumor disappeared completely. In sixteen, progress was not arrested, while four cases proved fatal from peritonitis.

In 1879, Drs. Martin and Cheron reported four cases in which they had used the continuous current. One pole on the neck of the uterus, the other placed *upon* the abdominal wall. They claimed that an uninterrupted continuous current rapidly diminished the size of a fibroid tumor, but would not make it disappear entirely in less than two and a half years. They also noted that the hemorrhages were much diminished.

In 1881, M. Gallard, with his pupil, Dr. Pegoud, studied the action of the continuous current on fibroid uteri, using an instrument resembling a sound with an olive-shaped tip of platinum. This was introduced, if possible, into the cervical canal; otherwise it was simply placed upon the neck, the tip being protected by a sponge. The other pole was connected with copper plates, covered with chamois skin dipped into a saline solution, these were placed upon the abdomen.

Their observations differed from all the previous ones, in that the hemorrhages were not arrested or diminished, that the menstrual period always appeared a few days too soon; the other results were also negative. This was discussed by Dr. Onimus, who thought it due to the use of too many (elements) cells—fifteen having been used by the operator—and suggested that never more than ten should be used. The error was, however, on the wrong side; when we come to look at Dr. Apostoli's work on the subject, we find he has used as many as seventy-two cells on patients, who had borne them well, and produced good results. The mere mention of cells, however, gives no definite idea of strength, since two cells composed of the same elements vary in strength in direct ratio with the amount of usage and age of exciting liquid, not considering the effect generally produced on electricity by the state of the weather.

In the report brought before the notice of the profession by Dr. Lucien Carlet in 1884, we find full particulars of Dr. Apostoli's treatment and its results. The important points in its favor are: if followed carefully there is little or not danger of shock or peritonitis, and the patient is always more or less benefited. His careful observations and studies have done much to simplify its use, as well as furnish us with careful directions regarding the length of treatment, strength of current, and application of the poles. The advantages are, that it can be done without an anesthetic, in the office, is not apt to produce shock, and the danger of the wound made is reduced to a minimum. The needle is used exclusively through the vaginal portion of the tumor.

A little more than two years ago, I had the pleasure of seeing Dr. Apostoli at his clinic, his work was conscientiously done, and the patients, without exception, expressed themselves much improved by the treatment.

The active electrodes used were of two kinds, usually combined in one instrument, a long, moderately thick probe, finished on one end like a uterine sound; the other straight, with its extremity shaped like a spear with cutting edges. The one end would be sheathed in the handle while the other was being used, or vice versa. This was either of platinum or gold, the two metals least affected by the current. A rubber or glass tube was used as an insulator.

The passive electrode consisted of a pad of clay to cover the abdomen, the current connected with a copper or leaden plate was placed on the pad. This made resistance stronger, and distributed the current more evenly.

The internal electrode was usually negative, unless hemorrhage was a troublesome symptom, when the positive became the active electrode; this, being the acid pole, produces a caustic effect, and at the same time a contraction and condensation of the tumor. The sound is used more often than the spear; the latter is used in two particular instances with advantage.

1st. When a fibroid is within easy reach through the vagina.

2d. In a large intramural fibroid, when the instrument is passed along the uterine canal and plunged a short distance into the fibrous tissue.

It is needless to say, in our enlightened age, that complete and careful antisepsis of both vagina and instruments is of absolute importance. The instruments are made antiseptic by heat (alcohol lamp), and the vagina cleansed with an antiseptic solution. A milliamperemeter is also an indispensable aid to the careful physician.

For nearly two years I have had an opportunity to watch six cases, for a space of time sufficient to give an account which may prove interesting.

CASE I.—Mrs. K. W., white, æt. 58, four, children, two miscarriages; seen 1st of March,

1886. History: Prolonged, profuse and painful menstruation, steadily increasing for the last six years, together with a feeling of weight and dragging pain in the lower part of the abdomen, also an inability to sit down without pain. Examination revealed an enlarged and irregularly nodulated uterus, occupying almost the entire pelvic cavity. Uterine cavity, four and a half inches. To the right of the uterus, a small flattened body was felt, which could be separated in its lower half from the uterine body. There was no nausea or exaggerated pain on pressure. Faradic electricity was used (negative pole in the uterus-positive on the abdomen) thrice weekly for four weeks, after which the galvanic current was used exclusively. All the treatments were intra-uterine, with two exceptions, when the puncture was used. The uterus began to diminish slowly but steadily in bulk, after the first six weeks, until, in the early part of August, it measured three inches. The body smooth, almost normal to touch; the flattened mass on the right gradually became more rounded, and was now about the size of an English walnut, separate from the uterus, pressure giving some pain and nausea. About this time treatment was suspended. In November, nearly three months later, presented herself at my office. Uterus retroflexed and turned to the left; cavity, two and three-quarter inches; right and posterior half of pelvis occupied by a painless cystic tumor, about as large as a medium-sized orange. An operation was advised. March, 1887, I made an abdominal section, removed a parovarian cyst. *The uterus was seen to be perfectly normal in size and appearance.*—*Am. Jour. of Obstet.*

FLOODING.

(MONTGOMERY.)

A woman of twenty-eight complains of flooding for three weeks. Examination shows that uterus is about as large as that of a three months' pregnancy; but it does not feel like a pregnant uterus, nor do the other conditions favor this view. The probabilities are that we have here soft growth in the cavity of the uterus. Although she says that she has not had a chance to become pregnant since last November, we will not take the risk of inserting a sound into the uterus till we have had the woman under farther observation. Meanwhile she will be given this prescription for the flooding.

R Ext. cannabis indicæ..... .gr. viij
Ext. ergotæ fluidi..... ʒ j
Ext. hamamelis fluidi..... ʒ ss
Tinct. cinnamomi..... ʒ ss

M. Sig.—Teaspoonful three times a day.

Ergot would not be contra-indicated even if we knew her to be pregnant. Injection of hot water will also be given. As soon as we are quite sure that there is no pregnancy, the os will be dilated with a tent wide enough to introduce a finger; and then a positive diagnosis can be made.

HOW TO TREAT CRAMPS IN THE LEGS.

Many persons of both sexes are greatly troubled with cramps in one or both their legs. It comes on suddenly, and is very severe. Most people jump out of bed (it nearly always comes on either just after going to bed, or while undressing) and ask some one to rub the leg. I have known it to last for hours, till, in despair, they would send for the family physician; and even then it would be hours before the spasms would let up.

There is nothing easier than to make the spasm let go its hold, and it can be accomplished without sending for a doctor, who may be tired and in need of a good night's rest. When I have a patient who is subject to cramps, I always advise him to provide himself with a good, strong cord. A long garter will do if nothing else is handy. When the cramp comes on, take the cord, wind it around the leg over the place that is cramped, and take an end in each hand and give it a sharp pull—one that will hurt a little. Instantly the cramp will let up, and the sufferer can go to bed assured that it will not come on again that night. For the permanent cure, give about six or eight cells of galvanic battery, with the negative pole applied over the spot that cramps, and the positive pole over the thigh. Give it for ten minutes, and repeat every week for one month.

I have saved myself many a good night's rest, simply by posting my patients, subject to spasm of the legs, how to use the cord as above. I have never known it to fail, and I have tried it after they had worked half the night, and the patient was in the most intense agony. Even in such cases, at the first jirk of the cord, all pain left.—*R. W. St. Clair, M. D., Medical Age.*

PNEUMONIA IN CHILDREN.

Child of twenty-two months; admitted May 1st; has had persistent cough; temperature ranging from 100° to 103°; dullness, but not very marked, at base of right lung; mucous râles at the same spot. Diagnosis, catarrhal pneumonia. Dr. Stryker said that this case illustrated the fact that very young children rarely have the symptoms of pneumonia so well marked as they are in adults. Instead of complete dullness at the affected spot, there is merely a modified dullness, and auscultation shows that some air is entering the vesicles at this point.

Before being admitted the child had suffered from bronchitis. This has extended to the air cells, and now the child has both bronchitis and pneumonia. As for treatment, generally the simpler the better.

You might try a mild mustard plaster, but do not leave it on until there is any possible irritation. Turpentine stupes are also good.

He is not in favour of poultices on account of their sogginess, and the sudden changes of temperature to which the child is subjected through the changing of the poultices. He prefers a thick packet of cotton around the chest.

The treatment given was a mixture of *mistura glycyrrhizæ comp., ammonii chloridum, syr. senegæ, and syr. ipecac.*

A little paregoric was added to a dose when thought necessary, on account of the cough.—*Philadelphia Medical Times.*

ANTIPYRIN IN MIGRAINE.

During the last two months I have treated twenty cases of migraine; several of the patients having suffered for over ten years, and, finding all drugs useless, had become reconciled to being periodically prostrated for one or two days. In every case I ordered eight grains of antipyrin, dissolved in water or lemonade, to be repeated each half hour until cured, the patient to remain lying down. Most of the cases were quite cured by two powders, but the most obstinate yielded to three, and in no case did the antipyrin fail. A cup of warm tea sometimes seemed to help, and the only inconvenience due to the treatment was, in a few of the cases, considerable sweating.

Many of the patients can hardly credit that, instead of being utterly helpless for twenty-four hours, they can now cut short an attack in one hour.

There is another great advantage in using antipyrin, and that is that it prevents as well as cures these attacks. One lady, who cannot remember having fewer attacks than three a month, each lasting about thirty-six hours, has been quite free for about eight weeks, and this she attributes solely to the occasional use of an antipyrin powder.—*Med. Review.*

WEAK THROAT.

He advised a woman who had a weak throat, that is, the mucous membrane was relaxed, and caused sensations of a sore throat without its actually being sore, to pursue this treatment: On one sumac top, as fresh as possible, she was to pour a pint of boiling water; and into this put a teaspoonful of common salt. Keeping the water warm, she was to gargle her throat thoroughly every three hours. Atkinson has seen this treatment have a remarkably beneficial effect.

Hypodermic or other syringes, when clogged so that a fine wire cannot be forced through them, may be cleaned by holding them over a spirit flame for a moment, and the foreign matter will be quickly expelled or destroyed, so that liquids may be used immediately. When a wire has rusted in a needle, dip the point in oil, then hold it over a flame, and it can be removed. It is well to draw oil through the point, then heat it, and rust will be removed from the interior; afterwards wash with alcohol, and it is ready for use.—*Memphis Medical Monthly.*

BORIC ACID A REMEDY FOR STYE.

Dr. Geo. Reuling says: I have found a simple and effective remedy for stye to be a solution of fifteen grains of boric acid to an ounce of water. By applying this solution three times a day to the inflamed part of the eyelid, by means of a camel's hair brush, this painful and annoying affection will be conquered very rapidly—*Virginia Med. Monthly*, October, 1887.

THE CANADA MEDICAL RECORD

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FRANCIS W. CAMPBELL, M.A., M.D., L.R.C.P. LOND
Editor and Proprietor.

ASSISTANT EDITOR:

A. LAPHORN SMITH, B.A., M.D., M.R.C.S. Eng., F.O.S.
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CONTAGIOUSNESS OF PHTHISIS.

We had the pleasure the other day of a conversation with an esteemed confrère, Dr. Osler, now Professor of Clinical Medicine in the University of Pennsylvania, on the above subject. It has long been our opinion, based on clinical facts, that Phthisis is rather a contagious than a hereditary disease. That is to say, that a man dying of phthisis leaving only one child born after his death, and in another house, free from the germs of tubercle, and from a mother who had not been infected with the disease, such a man, we say, would not transmit tubercle to his child. Such a case rarely happens, but on the contrary, the children of tubercular parents almost invariably have their lungs saturated with tubercle bacilli immediately after their birth. But we maintain that if such children were removed immediately to healthy surroundings, they would start in life with an inherited weak constitution, it is true, but with no specific tendency to phthisis. They would be more liable to contract phthisis on exposure to the germs, just the same as but not more than any other person of weak constitution. There is a general law to be seen in nature, in virtue of which lower organisms prey upon the weaker members

of the higher area. For instance, as long as the green leaf is strong and well nourished, fungi do not touch it. But the moment that from any cause the vitality of the leaf is materially affected, then the fungi seize upon it and soon consume it, leaving nothing but a fibrous skeleton. Now just in the same way when a case of phthisis is imported into a house occupied by a family, in which for a hundred years back no one had died of phthisis, the weakest organized inmates of that house will contract the disease one after the other. The fact that certain members of the family escape only proves that their vitality was strong enough to resist it. Do we not see the same thing during an epidemic of typhoid? We know that the period of incubation of typhoid is only a week or two, and yet it is a common thing to find that the patient had not been feeling well for some months; he had been below par, as they often say.

An argument sometimes used against the contagiousness of phthisis is the apparent immunity of nurses in consumptive hospitals. But this can be easily explained; only the strongest constitutions are engaged in such institutions; and if any of them should show signs of failing health, she would be immediately ordered away.

On submitting the above argument to Dr. Osler, he expressed himself at being thoroughly convinced of the contagiousness of phthisis, and he informed me that he had seen the advance sheets of a work about to be brought out in Philadelphia on this very question. The importance of this subject cannot be over-estimated, more people die of consumption than of any other known disease, and while many other formerly very fatal diseases are rapidly disappearing under the direction of sanitary science, the death rate from phthisis remains almost as great as ever. And yet we feel convinced that it, too, might be made to disappear completely from off the face of the earth, under a proper system of isolation. This of course is out of the question at present; public opinion must first be prepared for it through the profession. It is with the object of calling the latter's attention to it that we have made the above remarks. Let medical men, when taking the family history and previous history of a consumptive patient, no longer rack his and the patient's brain to find a remote ancestor who had the disease, but let him rather enquire as to the surroundings of the patient during the

last few years. In some cases he will find that the disease was imported by a pretty, blue-eyed, white-skinned nurse girl, who before coming to them had been nursing her sister who died of consumption; in other cases it will be found to have been caught from a consumptive husband or wife; in some cases even it has been contracted from a fellow lodger, whose name perhaps the patient does not know. Many examples of the above means of contagion have come to our knowledge, and we believe that it is the duty of the profession to put those who look to us for guidance on their guard against contracting this terrible disease.

CANADIAN MEDICAL ASSOCIATION.

The following papers have been promised for the meeting of the Canadian Medical Association, which will be held in Ottawa, on the 12th, 13th and 14th of September:

1. Face Presentations—Dr. W. M. MacKay, Woodstock.
2. The Mortality of Pneumonia—Dr. Wm. Osler, Philadelphia.
3. The Duty of the Medical Profession under the Public Health Act of Ontario—Dr. Wm. Canniff, Toronto.
4. On some Minute but important Details in the Management of the Continuous Current in the Treatment of Fibroid and other Diseases of the Uterus—Dr. A. L. Smith, Montreal.
5. A Case of Resilient Stricture of the Urethra Cured by Electricity—Dr. A. L. Smith, Montreal.
6. On the Treatment of Varicocele and Orchitis by the Electrical Current—Dr. A. L. Smith, Montreal.

Papers have also been promised by Drs. Fenwick, Shepherd, Alloway, Blackader, and Bell, of Montreal, and many others.

THE CODE OF ETHICS OF THE AMERICAN MEDICAL ASSOCIATION.

ART. IV.—*Of the duties of physicians in regard to consultations.*

1. A regular medical education furnishes the only presumptive evidence of professional abilities and acquirements, and ought to be the only acknowledged right of an individual to the exercise and honors of his profession. Nevertheless, as in consultations the good of the patient is the sole object in view, and this is often dependent on personal confidence, no intelligent regular practitioner, who has a license to practice from some medical board of known and acknowledged respect-

ability, recognized by this Association, and who is in good moral and professional standing in the place in which he resides, should be fastidiously excluded from fellowship, or his aid refused in consultation, when it is requested by the patient. But no one can be considered as a regular practitioner or a fit associate in consultation, whose practice is based on an exclusive dogma, to the rejection of the accumulated experience of the profession, and of the aids actually furnished by anatomy, physiology, pathology and organic chemistry.

2. In consultations, no rivalry or jealousy should be indulged; candor, probity and all due respect should be exercised toward the physician having charge of the case.

3. In consultations, the attending physician should be the first to propose the necessary questions to the sick; after which the consulting physician should have the opportunity to make such further inquiries of the patient as may be necessary to satisfy him of the true character of the case. Both physicians should then retire to a private place for deliberation; and the one first in attendance should communicate the directions agreed upon to the patient or his friends, as well as any opinions which it may be thought proper to express. But no statement or discussion of it should take place before the patient or his friends, except in the presence of all the faculty attending, and by their common consent; and no *opinions or prognostications* should be delivered which are not the result of previous deliberation and concurrence.

4. In consultations, the physician in attendance should deliver his opinion first; and when there are several consulting, they should deliver their opinions in the order in which they have been called in. No decision, however, should restrain the attending physician from making such variations in the mode of treatment, as any subsequent unexpected change in the character of the case may demand. But such variation, and the reasons for it, ought to be carefully detailed at the next meeting in consultation. The same privilege belongs also to the consulting physician if he is sent for in an emergency, when the regular attendant is out of the way, and similar explanations must be made by him at the next consultation.

5. The utmost punctuality should be observed in the visits of physicians when they are to hold consultations together, and this is generally practicable, for society has been considerate enough to allow the plea of a professional engagement to take precedence of all others, and to be an ample reason for the relinquishment of any present occupation. But as professional engagements may sometimes interfere, and delay one of the parties, the physician who first arrives should wait for his associate a reasonable period, after which the consultation should be considered as postponed to a new appointment. If it be the attending physician who is present, he will, of

course, see the patient and prescribe ; but if it be the consulting one, he should retire, except in case of emergency, or when he has been called from a considerable distance, in which latter case he may examine the patient, and give his opinion in *writing* and *under seal*, to be delivered to his associate.

6. In consultations, theoretical discussions should be avoided, as occasioning perplexity and loss of time. For there may be much diversity of opinion concerning speculative points, with perfect agreement in those modes of practice which are founded, not on hypothesis, but on experience and observation.

7. All discussion in consultation should be held as secret and confidential. Neither by words nor manner should any of the parties to a consultation assert or insinuate that any part of the treatment pursued did not receive his assent. The responsibility must be equally divided between the medical attendants—they must equally share the credit of success as well as the blame of failure.

8. Should an irreconcilable diversity of opinion occur when several physicians are called upon to consult together, the opinion of the majority should be considered as decisive ; but if the numbers be equal on each side, then the decision should rest with the attending physician. It may, moreover, sometimes happen that two physicians cannot agree in their views of the nature of a case and the treatment to be pursued ; this is a circumstance much to be deplored, and should always be avoided, if possible, by mutual concessions, as far as they can be justified by a conscientious regard for the dictates of judgment. But in the event of its occurrence, a third physician should, if practicable, be called to act as umpire ; and, if circumstances prevent the adoption of this course, it must be left to the patient to select the physician in whom he is most willing to confide. But, as every physician relies upon the rectitude of his judgment, he should, when left in the minority, politely and consistently retire from any further deliberation in the consultation, or participation in the management of the case.

9. As circumstances sometimes occur to render a *special consultation* desirable, when the continued attendance of two physicians might be objectionable to the patient, the member of the faculty whose assistance is required in such cases should sedulously guard against all future unsolicited attendance. As such consultations require an extraordinary portion of both time and attention, at least a double honorarium may be reasonably expected.

10. A physician who is called upon to consult should observe the most honorable and scrupulous regard for the character and standing of the practitioner in attendance ; the practice of the latter, if necessary, should be justified, as far as it can be, consistently with a conscientious regard for truth, and no hint or insinuation should be thrown out which could impair the confidence

reposed in him, or affect his reputation. The consulting physician should also carefully refrain from any of those extraordinary attentions or assiduities which are too often practiced by the dishonest for the base purpose of gaining applause, or ingratiating themselves into the favor of families and individuals.

PERSONALS.

We had the pleasure of a visit from our confrère and former pupil, Dr. W. E. Fairfield, Gold Medalist of Bishop's College, who has been established for some little time at Wequiock, Wisconsin, and where, we are glad to learn, he is proving no exception to the rule that Bishop's College men are never very long in making a reputation for themselves wherever they may cast their lot. He is on a pleasure trip to New York.

Drs. Ross, Roddick, Shepherd, Bell and Lapthorn Smith, the last of whom has been invited to read a paper before the Association of Gynecologists and Obstetricians, intend to leave for Washington on the 16th of Sept. The first four gentlemen will attend the meetings of the American Association of Surgeons and Physicians. They will be absent about a week.

REVIEW.

A treatise on Diphtheria, historically and practically considered, including Croup, Tracheotomy and Intubation, by A. SAUVÉ, Docteur en Médecine, ancien des Hôpitaux de Paris, etc., etc.; translated, annotated and the surgical anatomy added ; illustrated with a full page colored lithograph and many wood engravings, by Henry Z. Gill, A.M., M.D., LL.D., etc., published by J. H. Chambers & Co., St. Louis, Mo.

The translator, Dr. Gill, must thoroughly understand French idiotinically, and we compliment him on the success of his translation and on the many practical additions made by him, including intubation. We can highly recommend this book to any medical man, who, having to deal much with this so often fatal disease, desires to keep himself abreast of the times, not only in treatment, but with every aspect of it. It is the most exhaustive treatise we have seen dealing alone with this subject, and when we consider that over 600 authors have been consulted including those of every nation, some idea may be formed of the amount of labor expended by the author in its production.